APPARATUS AND METHODS OF DETECTING FEATURES ON A MICROARRAY

ABSTRACT OF THE INVENTION

Sub a1 A microarray apparatus with enhanced feature detectability, a method of making the apparatus and methods for detecting features on the apparatus provide for accurate detection of each feature location, regardless of the quality or quantity of signals from hybridized oligomer test probes. The apparatus and methods comprise a control probe or stilt at each feature location on the microarray. The control probe comprises a sequence of nucleic acids unique to the control probe. When the control probe is labeled with a label that emits a signal when excited by light, such as by a microarray scanner, the label from the control probe is detected separately, preferably in a separate control signal detection channel of the detection portion of the scanner. Thus, the microarray apparatus of labeled control probes can be evaluated non-destructively for quality control purposes before it is used for hybridization experiments. An oligomer test probe is attached to each feature of the microarray, such that each feature comprises a control probe and a test probe. In one embodiment, the oligomer test probe is attached to one end of the control probe, such that the control probe acts as a stilt essentially extending the oligomer test probe away from the surface of the microarray. Thus, there can be a 1:1 correlation between the quantity of control probe and the quantity of oligomer test probe. After hybridization with experimental target and control-specific target materials, the microarray is interrogated such that a control signal indicative of the location of each and every feature on the array will be emitted and a test signal indicative of the hybridized oligomer test probes will be emitted. The signals are collected in separate channels of the scanning system. Thus, the location of dim or weak signals from hybridized test probes can be detected and/or located using the data collected from the control signals. Further, every feature on the microarray can be directly normalized for various signal trends (global or local) across the array.